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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/453,831	12/02/1999	KENRO NAKAMURA	04329.2199	3119

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 12/12/2002

18

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/453,831	NAKAMURA ET AL.	
	Examiner	Art Unit	
	Lynette T. Umez-Eronini	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11, 12 and 17-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11, 12 and 17-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This communication is in response to an Appeal Brief filed on August 5, 2002. The After Final Amendment filed April 3, 2002, amending claim 17 and canceling claims 1, 4, and 5 has been entered. A new office action is presented.

Information Disclosure Statement

1. The information disclosure statement filed July 16, 2002 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because Japanese documents 9-17972, 4-156511, and 2000-253946 lack an English translation. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 11 and 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Westmoreland (US 5,750,440) in view of Danielson et al. (US 5,407,526).

Westmoreland teaches a planarizing (polishing) method that comprises:

As pertaining to **claim 17-22**, removing ruthenium metal and/or ruthenium dioxide includes an amount of ceric ammonium nitrate, that may be in the form of a liquid etchant solution, and in one form, and, in one form, the solution may be an aqueous solution wherein ceric ammonium nitrate and, optionally, other solutes, are dissolved in liquid water (column 3, line 42-49), which is the same as preparing a first polishing liquid containing tetravalent cerium ions or cerium (IV) nitrate in a first concentration wherein the ceric ammonium nitrate is the same as applicant's first polishing liquid; and

dissolving the 0.5-70 weight percent of ceric ammonium nitrate and, optionally, other solutes, in water and applying the ceric ammonium nitrate solution to a (Ru) surface (column 3, lines 55-57), reads on adding a solvent to said first polishing liquid to form a second polishing liquid containing tetravalent cerium ions in a second concentration lower than the first concentration; and

using the ceric ammonium nitrate whether in solution form or otherwise, also may be used as an active chemical component of a slurry used in a planarization process for planarizing a surface (column 5, lines 10-13; column 1, lines 37-41; and column 3, lines 66-67), which reads on,

polishing a surface of a substrate containing Ru or a Ru compound in a surface region with the second polishing liquid, as in claims 12,

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Westmoreland differs in failing to explicitly teach the addition of the solvent is carried out upon or immediately before the polishing of said substrate, **in claims 17 and 22.**

Danielson teaches an abrasive solution and a oxidant solution are stored separately in containers, pumped into a mixing chamber where they are mixed so as to form a slurry, and the slurry is then immediately used to polish/etch a semiconductor device (Abstract). Since Danielson teaches a method of preparing an abrasive solution (polishing liquid), mixing the abrasive solution with an oxidant (same as diluting the initial polishing liquid) to form a slurry (a second polishing liquid), and using the slurry immediately to polish/etch a semiconductor device, then using Danielson's polishing method would read on applicant's step of addition of the solvent is carried out upon or immediately before the polishing of said substrate, as in the claimed invention.

Hence, it is the examiner's position it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Westmoreland by using Danielson's method wherein said adding a solvent is carried out upon or immediately before the polishing of said substrate for the purpose of creating of slurries which give superior polish/etch rate (column 2, lines 7-10).

4. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Westmoreland (US '192) in view of Danielson ('526) as applied to claim 17, and further in view of Takikawa et al. (US 4,574,292).

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Westmoreland in view of Danielson differs only in failing to teach the Ru compound is SrRuO_3 , in claim 12.

Takikawa teaches a metal oxide film containing Ru and a metal M provides a very stable structure of RuSrO_3 (column 2, lines 39-45), which read on a Ru compound is SrRuO_3 .

Hence, it is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Westmoreland in view of Danielson by using a Ru compound such as SrRuO_3 the purpose of improving the electrical properties of the device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 703-306-9074. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-972-9310 for regular communications and 703-972-9311 for After Final communications.

Lynette T. Umez-Eronini

ltue

December 9, 2002